

Transference of *Cynanchum matsumurae* T.Yamaz. to *Tylophora* (Asclepiadaceae)

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We conducted a morphological re-examination of *Vincetoxicum matsumurae* (T.Yamaz.) H.Ohashi (= *Cynanchum matsumurae* T.Yamaz.) and *Tylophora tanakae* Maxim. Corona and pollinarium of *V. matsumurae* agreed with those of *Tylophora*. Thus, we propose a new combination *Tylophora matsumurae*. (T.Yamaz.) T.Yamash. & Tateishi. Although *T. matsumurae* resembles *T. tanakae*, the former is distinguished from the latter in having oblong corolla-lobes, shorter inflorescence-rachis, narrower fruits and smaller seeds.

Key words: *Cynanchum matsumurae*, new combination, Ryukyus, *Tylophora tanakae*, *Vincetoxicum matsumurae*.

Vincetoxicum matsumurae (T.Yamaz.) H.Ohashi is a short, erect perennial herb growing in grasslands on windy headlands or exposed limestones near the seashore, and is endemic to Amami-ôshima, Kakeroma, Okinoerabu, Yoron, and Okinawa Islands in the Ryukyu Archipelago, Japan (Fig. 1; Yamazaki 1968, T. Yamashiro unpublished data). This species is listed as endangered in the red list of Japanese vascular plants (Environment Agency of Japan 2000).

Vincetoxicum matsumurae was originally described by Matsumura (1898) as *Cynanchum villosum* from Okinawa Island. Hatusima (1963) regarded this species only as a dwarf ecotype of *Tylophora tanakae* Maxim., which is distributed from Kyushu

Island to the Ryukyu Archipelago (Fig. 1). On the other hand, Yamazaki (1968) treated this species as a distinct species of *Cynanchum* section *Vincetoxicum* based on its suspended pollinia. Because of the presence of the earlier homonym of *C. villosum*, he gave it the new name, *C. matsumurae* T.Yamaz. Later, Ohashi (1990) raised this section to a genus and proposed several combinations under the promoted *Vincetoxicum*, and accordingly *C. matsumurae* was placed in *Vincetoxicum*. *Vincetoxicum matsumurae* sometimes resembles *T. tanakae* and has often been misidentified as it.

The genus *Vincetoxicum* is distinguished from *Tylophora* based on corona morphology and orientation of pollinia (Li et al.

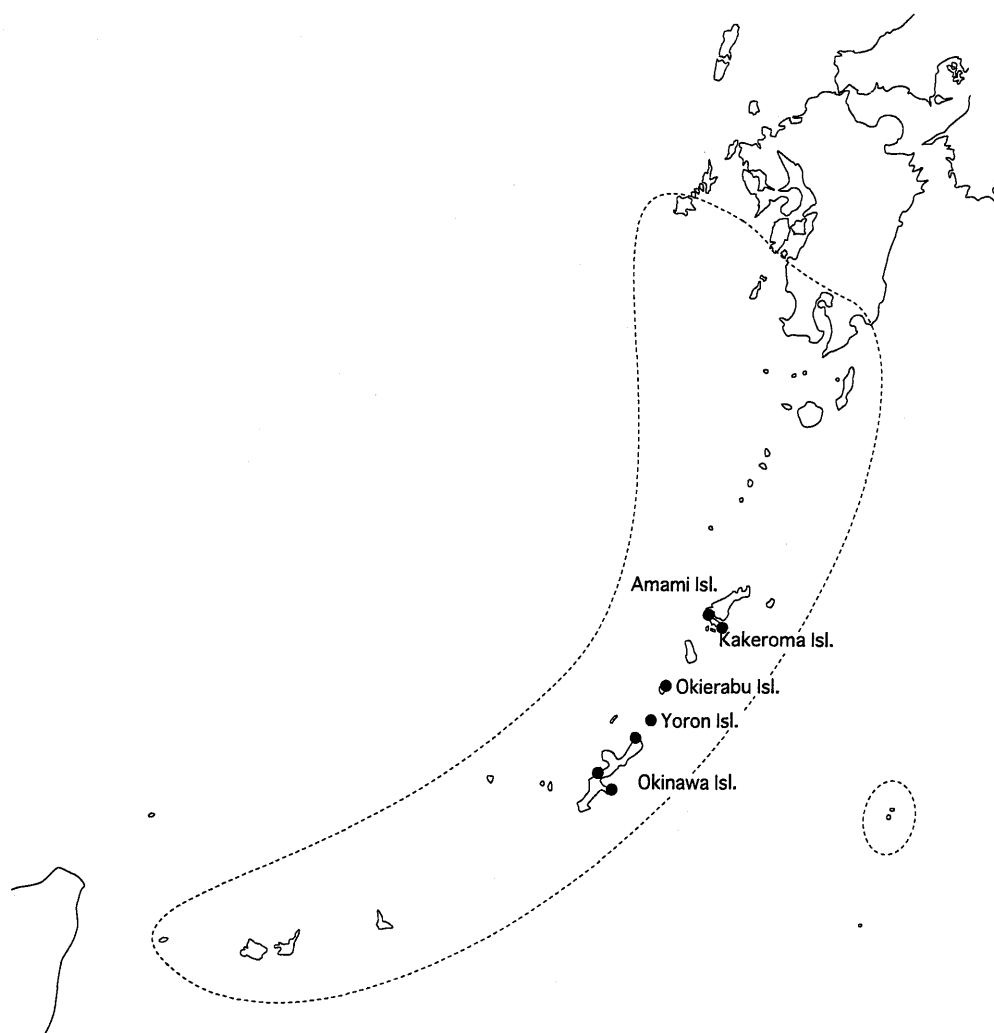


Fig. 1. Distribution map of *Tylophora matsumurae* and *T. tanakae*. Solid circles indicate the distribution of *T. matsumurae* and dotted lines indicate the distribution of *T. tanakae*.

1995). The corona lobes of *Vincetoxicum* are inserted at the base of gynostegium and its pollinia are pendulous, while those of *Tylophora* are inserted on the backs of anthers and its pollinia are horizontal to erect (Li et al. 1995). The coronas of *V. matsumurae* are inserted on the backs of the anthers and are separate from each other (Fig. 2A, d). The pollinarium of *V. matsumurae* is similar to that of *T. tanakae* (Fig. 3A, B).

The corpusculum of *V. matsumurae* is trapezoid and the caudicles are ascending and filiform (Fig. 3A). The pollinarium is placed horizontally in anther sac. Because the morphological characters of the corona and pollinarium of *V. matsumurae* well agreed with those of *Tylophora*, we propose new combination under *Tylophora* for this species. Although *V. matsumurae* is morphologically similar to *T. tanakae*, there are

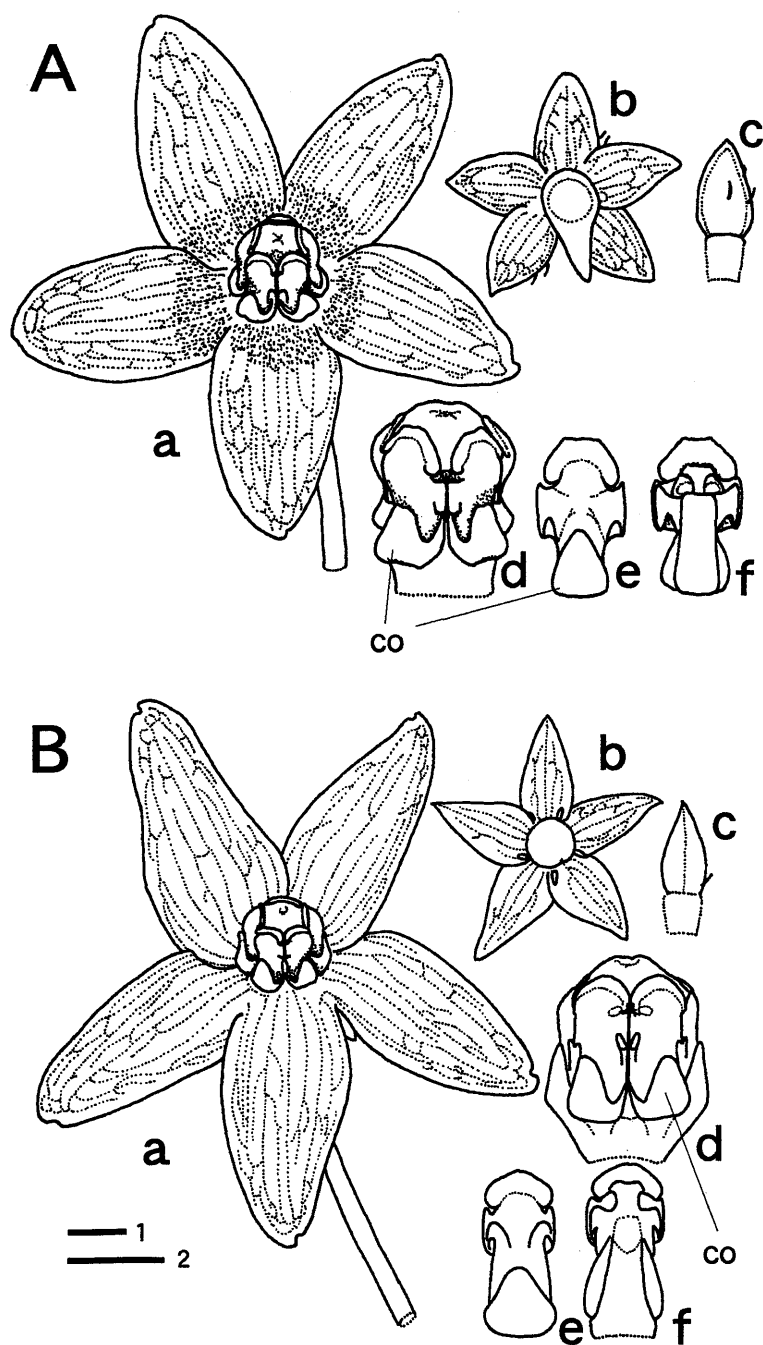


Fig. 2. Floral morphology of the flowers of *Tylophora matsumurae* (A) and *T. tanakae* (B). a. whole flower. b. adaxial side of calyx, pistil, corolla, corona and stamens removed. c. abaxial side of calyx lobe. d. gynostegium and corona. e. abaxial side of stamen. f. adaxial side of stamen (co = corona lobe). Bar 1 indicates 1 mm for a-c, and bar 2 indicates 1 mm for d-f.

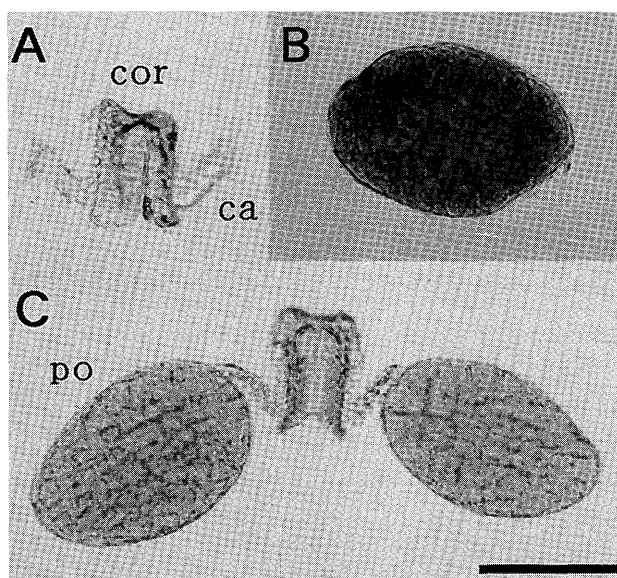


Fig. 3. Pollinaria of *Tylophora matsumurae* (A–B) and *T. tanakae* (C). A. Corpusculum and caudicle of *T. matsumurae*. B. Pollinium of *T. matsumurae*. C. Pollinarium of *T. tanakae* (cor = corpusculum, ca = caudicle, po = pollinium). Bar = 100 μ m. In *T. matsumurae*, pollinarium could not be removed intact from anther sac, because anther sac does not dehisce even in opened flower.

Table 1. The morphological differences between *Tylophora matsumurae* and *T. tanakae*

Characters	<i>T. matsumurae</i>	<i>T. tanakae</i>
Habit	erect	creeping, twining or erect
Stem length (m)	0.1–0.4	0.2–3
Leaf blade shape	elliptic	oblong, elliptic (at base of stems) or ovate (at lateral shoots)
Leaf blade length \times width (cm)	1.4–4 \times 1–3.4	3–8 \times 2.5–5
Petiole length (mm)	1.3–2.9	4–18
Inflorescence-rachis length (mm)	absent to 0.1–1	4–18
Corolla lobe shape,	oblong	lanceolate
Corolla lobes length \times width (mm)	3.6 \times 2.3	4.1 \times 2.3
Hairiness of fruit	pubescent	pubescent or glabrous
Fruit length \times width (mm)	35–48 \times 4.8–6.4	40–60 \times 6.5–10
Seed length \times width (mm)	3.5–4.8 \times 1.6–2.5	5.2–8 \times 3–4

some differences in several characters (Table 1).

Tylophora matsumurae (T.Yamaz.) T.Yamash. & Tateishi, comb. nov.

Type: The Ryukyus. Okinawa Isl., Onnason (J. Matsumura, 25 Apr. 1897, fl., TI-Holotype).

Cynanchum villosum Matsum. in Bot. Mag. Tokyo **12**: 39 (1898), non Roem. & Schult. (1982).

Cynanchum matsumurae T.Yamaz. in J. Jpn. Bot. **43**: 222 (1968).

Tylophora hispida Decne. var. *tanakae* Hatus. in J. Geobot. (Kanazawa) **12**: 10 (1963), pro parte excl. syn. *T. tanakae* Maxim.

Vincetoxicum matsumurae (T.Yamaz.) H.Ohashi in J. Jpn. Bot. **65**: 277 (1990).

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Appendix

Voucher specimens for Fig. 1. Herbarium acronyms follow Index Herbariorum, part I (Holmgren et al. 1990).

1. ***Tylophora matumurae*** (T.Yamaz.) T.Yamash. & Tateishi

Kagoshima: Amami-ōshima Isl., Kuzi-Yuwan (G. Koidzumi, 4 May 1923, KYO); Kakeroma Isl., Angyaba (Z. Tashiro, 11 Mar. 1924, KYO); Okinoerabu Isl. (H. Ohba, 1924, KYO); China-cho, Taminazaki (T. Shimizu 85-449, 6 Apr. 1985, fl., TI); Wadomari-cho, Wadomari (T. Yamashiro 4061, 6 Aug. 1996, fl., URO); Yoron Isl., Maehama (T. Yamashiro & A. Yamashiro 7764, 3 Nov. 2001, fr., TUS). **Okinawa:** Okinawa Isl., Kunigami-son, Hedomisaki (T. Amano 6653, 25 Jul. 1951, fr., RYU)(E. H. Walker et al. s. n., 25 Jul. 1951, fl., TI); Onna-son (J. Matsumura, 25 Apr. 1897, fl., TI-Holotype); Manzamo (T. Kanashiro, 23 Nov. 1937, fr., RYU)(F. Yamazaki et al., 1 Apr. 1968, fl., TI) (A. Takushi, 22 Sep. 1968, fr., TI) (T. Yamazaki, 24 Jun. 1971, fr., TI)(Y. Miyagi 5721, Aug. 1966, fr., RYU) (Y. Tateishi & T. Yamashiro 45144, 6 Jun. 1998, fl., URO); Katsuren-cho (Y. Tashiro, May 1887, fr., TI).

2. ***Tylophora tanakae*** Maxim.

Nagasaki: Goto Isls., Fukue Isl. (Z. Tashiro s. n., fl., KYO). **Kumamoto:** Amakusa-gun, Hogashima (Tamiyama s. n., 20 Aug. 1931, fl., KYO & TI); Akunecohshima Isl. (S. Hayashimatsu s. n., 4 Aug. 1936, fl. & fr., KYO). **Miyazaki:** Toimisaki Cape (K. Nagai s. n., 4 Aug. 1964, fl., KYO). **Kagoshima:** Kushikino-shi, Nagasakibana (T. Yamashiro & A. Yamashiro 7801, 24 Feb. 2002, fr., TUS); Yamagawa-cho, Nagasakibana (Z. Tashiro s. n., 27 Aug. 1924, fl., KYO)(G. Murata, M. Togashi & H. Kanai s. n., 23 Jan. 1965, fr., KYO); Kimotsuki-gun, Sata-cho, Isashiki (G. Murata 12872, 9 Aug. 1959, fl., KYO); Tajiri (T. Yamashiro & A. Yamashiro 7775, 5 Nov. 2001, fr., TUS); Tanegashima Isl. (T. Makino s. n., anno 1938, fl., KYO). Yaku Isl. (Z. Tashiro s. n., Aug. 1919, fl., KYO); Kurio (J. Murata et al. 15743, 22 Oct. 1983, fr., KYO, TI) (M. Tagawa s. n., 31 Aug. 1933, fl., KYO); Kamiyaku-cho, Isso (T. Yamashiro & A. Yamashiro 7818, 28 Jan. 2002, fr., TUS); Kuchinoshima Isl. (S. Sako 7243, 18 Dec. 1968, fr., KYO, TI); Takara Isl. (M. Hori 790, 29 May 1953, fl., KYO); Amami Isl.,

Yamato-son, Odana (Y. Tateishi & T. Yamashiro 45592, 2 Aug. 1998, fl., URO); Kikai Isl. (K. Yamaguchi s. n., 21 May 1919, fl., KYO); Tokunoshima Isl., Isen-cho, Intabumisaki (K. Iwatsuki et al. 395, 26 Aug. 1975, fl., KYO); en route Ikema to Mt. Inokawadake (M. Kato & E. Miki 245, 27 Aug. 1978, fl., KYO); Okierabu Isl., China-cho, Tamina Cape (T. Yamashiro 4052, 5 Aug. 1998, fl. & fr., URO); Wadomari-cho, Hanzaki Cape (T. Yamashiro 4033, 4 Aug. 1998, fl., URO). **Okinawa:** Iheya Isl. (Y. Niino 3064, 28 Dec. 1958, st., RYU); Ie Isl., Waji (H. Ogawa 717, 4–5 Dec. 1994, fr., URO); Okinawa Isl., Nago (Z. Tashiro s. n., 16 Jan. 1924, fr., KYO); Onnason, Maeda-misaki Cape (Y. Miyagi 9078, 18 May 1980, fl., RYU); Manzamo (E. Takamine 2382, 4 Jul. 1974, fl. & fr. RYU); Naha-shi (G. Koidzumi s. n., 14 May 1923, fl., KYO); Shuri (S. Hatusima 34000, 1 Oct. 1972, fl., RYU); Naminoue (Y. Taira s. n., 16 May 1938, fl., KYO); Ohnoyama (Y. Muramatsu & I. Furusawa s. n., 29 Sep. 1940, fl., TI); Tsuji (T. Amano s. n., 20 Sep. 1951, fl., KYO); Itoman-shi, Gushikawajoshi (T. Yamashiro 4003, 2 Nov. 1997, fr., URO); Tokashiki Isl., Aharen (Y. Miyagi 9160, 6 Sep. 1980, fl. RYU); Aka Isl. (T. Yamashiro & A. Kuwataka 4410, 9 May 1999, fl., URO); Geruma Isl. (Y. Miyagi 7873, 9–12 Aug. 1977, fl., RYU) (G. Ikeda 4029, 9 Aug. 1977, fl. RYU); Aguni Isl. (S. Hatusima & Y. Miyagi 38610, 10–13 Aug. 1974, fl., RYU) (K. Shinjo & Y. Tateishi 12031, 9 May 1998, fl., URO); Tonaki Isl. (T. Yamashiro 1384, 3 Oct. 1995, fl. & fr., URO); Kume Isl. (Y. Niino 644, 24 Nov. 1957, fr., RYU); Nakazato-son, Ifu beach (T. Yamashiro 7836, 3 Feb. 2002, fr., TUS); Miyako Isl. (S. Sakaguchi s. n., anno 1922, fl., KYO) (S. Nakasone s. n., Jun. 1929, fr., KYO); Karimata (G. Koidozumi s. n., 16 Jun. 1923, fl., KYO) (M. Furuse 4613, 20 Nov. 1973, yfr., RYU); Hirara-shi, Nishizato (T. Amano 5855, 23 Nov. 1948, st., RYU); Gusukube-cho, Tomori (S. Hatusima et al. 36967, 4–9 Dec. 1973, fr., RYU); Higashihenna-zaki

(S. Hatusima et al. 38549, 6–11 Jul. 1974, fr., RYU); Irabu Isl. (S. Nakazone s. n., 13 Dec. 1936, fr., KYO); Nagayama (M. Furuse 4621, 21 Nov. 1973, fl., RYU); Ikema Isl. (S. Hatusima et al. 3823, 11 Jul. 1974, fl. RYU); Ohgami Isl. (S. Hatusima 3844, 11 Jul. 1974, st., RYU); Shimoji Isl. (I. Kawakami s. n., 17 Aug. 1973, fl., RYU); Minna Isl. (Y. Miyagi 7128, 27 Sep. 1975, fr., RYU); Ishigaki Isl., Hirakubozaki (S. Hatusima 33339, 6 Aug. 1972, fl., RYU); Nosoko (N. Fukuoka & M. Ito 132, 2 Aug. 1981, fl., KYO); Yarabu Pen., Kannonzaki (M. Furuse 666, 7 Aug. 1972, fl. bud, RYU); Hirae (S. Tawada s. n., 11 Aug. 1933, fl., KYO); Kabira beach (N. Fukuoka & M. Ito 306, 22 Oct. 1983, fl., KYO); North of Kawahara (Y. Tateishi et al. 40277, 16 Sep. 1994, fl., URO); Nakura (M. Furuse 537, 31 Jul. 1972, fl., RYU); Uganzaki (S. Hatusima 33289, 7 Aug. 1972, fl. bud, RYU); Iriomote Isl., Funauki (S. Tawada s. n., 12 Aug. 1936, fl., KYO); Funaura (M. Furuse 3969, 8 Sep. 1973, fl., RYU); Shirahama (E. H. Walker & S. Tawada 6520, 17 Aug. 1951, fl., TI) (G. Murata & H. Tabata 674, 9 Aug. 1974, fl., KYO); Toyohara (S. Hatusima 32910, 25 Jul. 1972, fl., RYU); Taketomi Isl. (M. Furuse 1456, 9 Oct. 1972, fl., RYU); Kuroshima Isl. (M. Furuse 932, 27 Aug. 1972, fl., RYU) (Y. Niino & Y. Miyagi 5975, 4 Nov. 1974, fr., RYU); Hatoma Isl. (K. Shimabuku 3553, Aug. 1976, fl., RYU); Aragusuku Isl. (Y. Miyagi 10442, 4 Aug. 1974, fl. bud, RYU); Yonaguni Isl., Sanninodai (Hatusima et al. 35877, 29 Sep.–3 Oct. 1973, fl., RYU); Mt. Urabudake (T. Yamashiro & S. Ujiie 4202, 12 Dec. 1998, fl & fr., URO); North slope of Mt. Kubura (T. Yamashiro & S. Ujiie 4197, 12 Dec. 1998, fl & fr., URO); Hateruma Isl. (M. Furuse 237, 8 Jul., 1972, fl. bud, RYU) (Y. Miyagi 6743, 9–15 Jul. 1975, fl. bud, RYU); Kitadaito Isl., (S. Hatusima 33714, 4 Oct. 1972, fl., RYU) (K. Shinjo 5078, 12–21 Mar. 1967, fl., URO); Minamidaito Isl. (S. Hatusima 33982, 8 Oct. 1972, fl., RYU).

山城 考^a, 立石庸一^b, 傳田哲郎^c, 横田昌嗣^c, 牧雅之^d: ヒメイヨカズラ (ガガイモ科) の所属

ヒメイヨカズラ *Vincetoxicum matsumurae* (T. Yamaz.) H. Ohashi (= *Cynanchum matsumurae* T. Yamaz.) を花部形態に基づいてオオカモメヅル属に組み替えた。ヒメイヨカズラはツルモウリンカ *Tylophora tanakae* Maxim. に非常によく似ていて、しばしば誤同定されているが、茎が短く直立すること、葉が楕円形であること、花冠列片の幅が広いこと、花序軸が短いこと、果実が細いこと、

種子が小さいこと等から区別できる。

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